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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
HIDEAKI YAMANAKA, ET AL. : EXAMINER: PHAN, TAM T
SERIAL NO: 09/690,010 :
FILED: OCTOBER 17, 2000 : GROUP ART UNIT: 2144
FOR: DIGITAL CONTENT :
DOWNLOADING SYSTEM USING
NETWORKS

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Applicants appeal the outstanding Final Rejection of May 12, 2005, finally rejecting each of pending claims 1-18.

I. REAL PARTY IN INTEREST

The above-noted application is assigned to Mitsubishi Denki Kabushiki Kaisha, which is the real party in interest, having a place of business at Tokyo, Japan.

II. RELATED APPEALS AND INTERFERENCES

Applicant and Applicant's representative are not aware of any related appeals or interferences that will directly effect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

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III. STATUS OF CLAIMS

Claims 1-18 are pending in this application and the rejection of each of claims 1-18 is being appealed.

No claims were cancelled, but Claims 17 and 18 were added during prosecution of this application.

IV. STATUS OF AMENDMENTS

A Request for Reconsideration was filed subsequent to the Final Rejection dated May 12, 2005. Accordingly, all previously filed Amendments have been considered by the Examiner and are reflected in the attached claims.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The applicants of the present invention recognized that a problem exists in the current art in that until the present invention there was not a digital content downloading system in which digital content possessed by a digital content retailer is downloaded to a consumer over a network at a particular reserved bandwidth.

Accordingly, Claim 1 sets forth a digital content downloading system using a network in which digital content, possessed by a digital content retailer communicatively coupled to the network, is downloaded to one of a plurality of consumers through the network, which generally finds support in Figures 1, 3, and 4; and pages 21-26 of the specification.

In particular, Claim 1 recites a plurality of subscriber lines each formed of an optical fiber and arranged between the consumers and the network, the network being managed by a network operator, which finds supports, e.g., in Figure 1 (network 21a, network operator 2a, subscriber lines), and pages 21, lines 3-26; and page 22, lines 25-26 (optical subscriber lines).

Further, Claim 1 recites an optical line terminator, arranged on one side of the network, for terminating a subscriber line on the network side, which finds support, e.g., in Figure 3 (optical line terminator 24) and page 24, lines 20-29.

Further, Claim 1 recites an optical network unit, arranged on a side of each consumer, for terminating a subscriber line on the consumer side, which finds support, e.g., in Figures 3 and 4 (optical network unit 13a), and page 24, lines 25-29. See also Figures 7 and 9 and the discussion related thereto in the specification.

Further, Claim 1 recites a star coupler configured to connect the subscriber lines terminated by the optical network units to the subscriber line terminated by the optical line terminator, which finds support, e.g., in Figure 3 (star coupler 14). See also page 4, line 5.

Further, Claim 1 recites a resource reservation server configured to reserve a particular bandwidth for the digital content in the subscriber lines in response to a request by a particular consumer, which finds support, e.g., in Figure 3 (resource reservation server 22) and page 24, lines 11-29.

Further, Claim 1 recites downward bandwidth managing means, arranged in the optical line terminator, for controlling downloading of the digital content from the digital content retailer to the optical network unit of the particular consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth reserved by the resource reservation server, which finds support, e.g., in Figure 3 (downward bandwidth managing unit 241) and page 24, lines 19-29.

Independent Claim 9 recites limitations analogous to the limitations recited in Claim 1, and is thus supported by the specification and the figures as set forth above. However, Claim 9 also recites (1) upward bandwidth managing means, which finds support, e.g., in Figure 11 (upward bandwidth managing unit 242) and pages 45-46; and (2) upward transmission control means arranged in the optical network unit of a particular content

retailer for controlling downloading of the digital content, which finds support, e.g., in Figure 11 (upward transmission control unit 3312a in optical network unit 33a of content retailer 3a) and pages 45-46.

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection being appealed are as follows:

(1) whether the combined teachings of U.S. Patent No. 6,288,809 to Touma et al. (hereinafter “the ‘809 patent”) and U.S. Patent No. 6,434,164 to Matsunaga et al. (hereinafter “the ‘164 patent”) renders obvious the subject matter of each of Claims 1-5, 8-13, and 16-18 under U.S.C. § 103(a);

(2) whether the combined teachings of the '809 and '164 patents, further in view of U.S. Patent No. 5,828,737 to Sawyer (hereinafter “the ‘737 patent”) renders obvious the subject matter of Claims 6, 7, 14, and 15 under 35 U.S.C. § 103(a); and

(3) whether the combined teachings of European Patent Application EP 869,634 to Wright et al. (hereinafter “the ‘634 patent”) and International Patent Application WO 98/18235 to Caterisano (hereinafter “the ‘235 patent”) render obvious the subject matter of Claims 1-3, 6-11, and 14-18 under 35 U.S.C. § 103(a).

VII. ARGUMENT

Rejection of Claims 1-8, 17, and 18 based on the '809 and '164 patents

Claim 1 is directed to a digital content downloading system using a network in which digital content, possessed by a digital content retailer communicatively coupled to the network, is downloaded to one of a plurality of customers through the network, comprising:

(1) a plurality of subscriber lines each formed of an optical fiber and arranged between the consumers and the network, the network being managed by a network operator; (2) an optical

line terminator, arranged on one side of the network, for terminating a subscriber line on the network side; (3) an optical network unit (ONU), arranged on a side of each consumer, for terminating a subscriber line on the consumer side; (4) a star coupler configured to connect the subscriber lines terminated by the optical network units to the subscriber line terminated by the optical line terminator; (5) a resource reservation server configured to reserve a particular bandwidth for the digital content in the subscriber lines in response to a request by a particular consumer; and (6) downward bandwidth managing means, arranged in the optical line terminator, for controlling downloading of the digital content from the digital content retailer to the optical network unit of the particular consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth reserved by the resource reservation server.

Regarding the rejection of Claim 1 under 35 U.S.C. § 103, the Office Action asserts that the '809 patent discloses everything in Claim 1 with the exception of the resource reservation server and the downward bandwidth managing means, and relies on the '164 patent to remedy those deficiencies.

The '809 patent is directed to an optical subscriber network system that connects plural optical network units to an optical service unit using passive optical elements through an optical transmission line. Applicants note that the Office Action asserts that the optical service station disclosed by the '809 patent reads on the claimed optical line terminator. However, as admitted in the Office Action, the '809 patent fails to disclose the resource reservation server and the downward bandwidth managing means recited in Claim 1.

The '164 patent is directed to a multiple-access communication system in which a center station dynamically allocates upstream bandwidth to subscriber stations upon receiving reservation information from the subscriber station. The '164 patent discloses that bandwidth may be reserved for subscriber stations to send data to the central station. In the regard,

Applicants note that the term “upstream” is consistently used by the ‘164 patent to indicate communication to (in the direction of) the center station 10, and that the term “downstream” refers to communication to the subscriber stations 30-32. Further, ‘164 Figures 2, 7, and 11 show “upstream bandwidth allocating means” 10*i*, 11*i*, and 12*i*, respectively for managing bandwidth in communication to the center station 10. The ‘164 patent does not disclose any type of downstream bandwidth allocating means. Further, the system components having the term “downstream” in their name in Figures 2, 7, and 11 of the ‘164 patent refer merely to means for the center station to *communicate* with the subscriber stations, not to controlling downstream bandwidth. See also Figures 3 and 8 of the ‘164 patent, which refer to the guaranteed upstream rate. Applicants note that the ‘164 patent does not refer to “a guaranteed downstream rate.”

Thus, for the reasons stated above, Applicants respectfully submit that the ‘164 patent fails to disclose downward bandwidth managing means, arranged in the optical line terminator, for controlling the downloading of the digital content from the digital content retailer to the optical network unit of the particular consumer, so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth reserved by the resource reservation server, as recited in Claim 1. The ‘164 patent fails to disclose that a downward path management means is arranged in an optical line terminator for controlling downloading of data. Further, the ‘164 patent fails to disclose that bandwidth is reserved for the downloading of the digital content from the digital content retailer to an optical network unit of a particular consumer. Rather, the ‘164 patent merely discloses the reservation of bandwidth for sending data from a subscriber station to the center station.

In this regard, Applicants note that the final Office Action dated May 12, 2005, includes a response to the arguments presented in the Amendment filed February 9, 2005.¹ In

¹ See pages 14-18 of the outstanding Office Action.

particular, item 48 on page 14 states that “it is submitted that these arguments were addressed in specific details in the supplemental office action sent on 11/09/2004, in which the applicant did not comment or challenge the Examiner’s reasoning in the response filed 02/09/2005.” However, Applicants respectfully submit that Applicant did comment on the Examiner’s reasoning regarding the downward bandwidth management means in the Amendment dated February 9, 2005. In particular, Applicants note that the Examiner directly quotes from those comments in the Office Action.

Regarding item 50 on page 15 of the Office Action, the Examiner provides an analysis of the internal data flow of the functional units of the center station 10 shown in Figure 2 of the ‘164 patent. As discussed above, three of the units shown in Figure 2 use the word “downstream,” i.e., the downstream data transmission means 10k, the downstream frame assembly means 10d, and the downstream signal receiving means 10b. However, Applicants respectfully submit that these units are configured to package and send information to the various subscriber stations 30-32. As discussed above, none of the units is related to allocating downstream bandwidth.

Regarding item 51, the Examiner asserts that, because there are bidirectional data flows among the functional units within the center station 10 shown in Figure 2 of the ‘164 patent, “it should be obvious that the ‘164 patent discloses bandwidth managing means [that] controls the transmission of information both in downstream and upstream [directions].”² However, Applicants respectfully submit that the directions of the arrows shown in Figure 2 relates only to the internal structure of the center station 10, and provide no evidence that the ‘164 patent discloses downward bandwidth managing means, as recited in Claim 1. Rather, the ‘164 patent merely discloses upstream bandwidth allocating means. As discussed above and in the Amendment filed February 9, 2005, the ‘164 patent does not discuss any type of

² See page 16 of the outstanding Office Action.

downstream bandwidth allocating means. As shown in Figure 2, the '164 patent merely discloses upstream bandwidth allocating means 10i.

Regarding items 52 and 53, the Examiner states that "the optical line terminator as described by the applicants' specification is arranged in an office of a network operator...."³ However, Applicants note that the Examiner is referring to a passage in the Background of the Invention section of Applicants' specification. Further, Applicants note that the claims do not recite the word "office." Moreover, Applicants respectfully submit that whether an "office" is equivalent to a "center station" is immaterial and does not change the fact that the '164 patent does not disclose a downward bandwidth managing means, as recited in Claim 1.

Moreover, Applicants respectfully submit that the combined teachings of the '809 and '164 patents would require that the '809 optical service unit be combined with or be a part of the '164 center station 10. However, it is unclear to Applicants which elements in such a combined system would correspond to the claimed digital content provider and which would correspond to the optical network units associated with the consumers. Moreover, as discussed above, the proposed combined system would not have downward bandwidth managing means for controlling downloading of digital content (at a reserved bandwidth) from a digital content provider to an ONU of a particular consumer, as recited in Claim 1.

Thus, no matter how the teachings of the '809 and '164 patents are combined, the combination does not teach or suggest the downward bandwidth management means recited in amended Claim 1. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claim 1 (and dependent Claims 2-5, 8, 17, and 18) should be withdrawn.

Regarding the rejection of dependent Claims 6 and 7 under 35 U.S.C. § 103, Applicants respectfully submit that the '737 patent fails to remedy the deficiencies of the

³ *Id.*

'809 and '164 patents, as discussed above. In particular, the '737 patent fails to disclose the downward bandwidth management means recited in independent Claim 1. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of dependent Claims 6 and 7 should be withdrawn.

Rejection of Claims 9-16 based on the '809 and '164 patents

Claim 9 is directed to a digital content downloading system using a network in which digital content, possessed by one of a plurality of content retailers communicatively coupled to the network, is downloaded to a consumer through the network, comprising: (1) a plurality of subscriber lines each formed of an optical fiber and arranged between the content retailers and the network, the network being managed by a network operator; (2) an optical line terminator, arranged on a side of the network, for terminating a subscriber line on the network side; (3) an optical network unit, arranged on a side of each content retailer, for terminating a subscriber line on the content retailer side; (4) a star coupler configured to connect the subscriber lines terminated by the optical network units to the subscriber line terminated by the optical line terminator; (5) a resource reservation server configured to reserve a particular bandwidth for the digital content in the subscriber lines for the downloading of the digital content to the consumer as a bandwidth reservation in response to a request by a particular content retailer; (6) upward bandwidth managing means, arranged in the optical line terminator, for receiving the bandwidth reservation from the resource reservation server; and (7) upward transmission control means, arranged in the optical network unit of a particular content retailer, for controlling downloading of the digital content from the optical network unit of the particular content retailer to the consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular

bandwidth according to the bandwidth reservation received from the upward bandwidth managing means

Although Claim 9 recites limitations analogous to the limitations recited in Claim 1, Applicants note that there are some differences between the claims. For example, the upward transmission control means recited in Claim 9 is arranged in the optical network unit of a particular content retailer, while Claim 1 recites downward bandwidth managing means arranged in an optical line terminator that terminates a subscriber line. However, both claims recite means for controlling downloading of digital content from the content retailer to the consumer at a particular reserved bandwidth.

Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claim 9 (and dependent Claims 10-13 and 16) should be withdrawn.

Further, regarding item 49 in the final Office Action, the Examiner refers to Applicants specification to state that “downward bandwidth managing means controls the transmission of the digital content of a downward signal...and upward bandwidth managing means control[s] the information of an upward signal transmitted in the upstream direction. Thus, bandwidth managing means controls the transmission of information in a downward and upward direction.”⁴ However, Applicants note that the Examiner does not provide a reference to Applicants specification regarding the suggested meaning of “upward bandwidth managing means.” In this regard, Applicants note that Claim 9 recites an upward bandwidth managing means, arranged in the optical line terminator, for receiving the bandwidth reservation from the resource reservation server. Further, Claim 9 recites an upward transmission control means, arranged in the optical network unit of a particular content retailer, for controlling downloading of the digital content from the optical network of the

⁴ See page 15 of the outstanding Office Action.

particular content retailer to the consumer....” Further, Applicants note that none of the claims recite the “bandwidth managing means,” as asserted by the Office Action. Further, Applicants respectively submit that Claim 9 does not recite “upward bandwidth managing means [for controlling]... the information of an upward signal transmitted in the upstream direction,” as stated in item 49. Rather, Claim 9 recites an upward transmission control means for controlling downloading of digital content from an optical network unit.

Regarding item 55, Applicants note that Claim 9 recites “upward transmission control means, arranged in the optical network of a particular content retailer, for controlling downloading of the digital content from the optical network of the particular content retailer to the consumer so that the digital content is transmitted through the subscriber lines and the start coupler at the particular bandwidth according to the bandwidth reservation received from the upward bandwidth managing means.” Thus, despite the name “upward transmission control means,” Claim 9 is directed to controlling the downloading of digital content from an optical network unit of a particular content retailer to a consumer.

Regarding the rejection of dependent Claims 14 and 15 under 35 U.S.C. § 103, Applicants respectfully submit that the ‘737 patent fails to remedy the deficiencies of the ‘809 and ‘164 patents, as discussed above. In particular, the ‘737 patent fails to disclose the downward bandwidth management means recited in independent Claim 9. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of dependent Claims 14 and 15 should be withdrawn.

Rejection of Claims 1-3, 6-11, and 14-18 based on the ‘634 and ‘235 patents

Regarding the rejection of Claim 1 under 35 U.S.C. § 103 as being unpatentable over the ‘634 and ‘235 patents, the Office Action asserts that the ‘634 patent discloses everything

in Claim 1 with the exception of the resource reservation server and the downward bandwidth managing means, and relies on the '235 patent to remedy those deficiencies.

The '634 patent is directed to a system for wavelength-division multiplexing in passive optical networks. However, as admitted in the Office Action, the '634 patent fails to disclose the resource reservation server and the downward bandwidth managing means recited in Claim 1.

The '235 patent is directed to a method for managing a flexible voice-band communications network allowing telecommunications customers to set up an arbitrary bandwidth connection upon demand for a Public Switched Telephone Network (PSTN). The '235 patent discloses a telecommunications system in which a customer can establish exclusive use of an end-to-end transmission channel at a requested time and bandwidth. However, Applicants respectfully submit that the '235 patent fails to disclose downward bandwidth managing means, arranged in an optical line terminator, for controlling downloading of digital content from a digital content retailer to an optical network unit of a particular consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth reserved by the resource reservation, as recited in Claim 1. Further, Applicants respectfully submit that since the '235 patent discloses that an end-to-end transmission channel (for which a user has exclusive use) is established, the '235 patent has no need for a downward bandwidth management means arranged in an optical line terminator for controlling the downloading of the digital content to an optical network unit of a particular consumer at a particular bandwidth, as recited in Claim 1.

Thus, no matter how the teachings of the '634 and '235 patents are combined the combination does not teach or suggest the downward bandwidth management means recited in Claim 1. Accordingly, Applicants respectfully submits that a *prima facie* case of

obviousness has not been established and that the rejection of Claim 1 (and dependent Claims 2, 3, 6-8, 17, and 18) should be withdrawn.

Further, Applicants note that the '634 patent is directed to passive optical networks, while the '235 patent is directed to managing voice-band communications. Accordingly, Applicants respectfully submit that one of ordinary skill in the art would not be motivated to combine the teachings of the '634 and '235 patents as suggested in the Office Action.

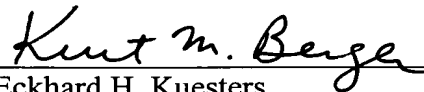
Claim 9 recites limitations analogous to the limitations recited in Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claim 9 (and dependent Claims 10, 11 and 14-16) should be withdrawn.

VIII. CONCLUSION

For the foregoing reasons, Applicant respectfully submits that each of claims 1-18 patentably distinguishes over the combination of teachings of the '809, '164, '737, '634, and '235 patents. Therefore, the outstanding rejections must be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Eckhard H. Kuesters
Attorney of Record
Registration No. 28,870
Kurt M. Berger, Ph.D.
Registration No. 51,461

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
EHKKMB:smi/fbl

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CLAIMS APPENDIX

1. (Rejected) A digital content downloading system using a network in which digital content, possessed by a digital content retailer communicatively coupled to the network, is downloaded to one of a plurality of consumers through the network, comprising:

a plurality of subscriber lines each formed of an optical fiber and arranged between the consumers and the network, the network being managed by a network operator;

an optical line terminator, arranged on one side of the network, for terminating a subscriber line on the network side;

an optical network unit, arranged on a side of each consumer, for terminating a subscriber line on the consumer side;

a star coupler configured to connect the subscriber lines terminated by the optical network units to the subscriber line terminated by the optical line terminator;

a resource reservation server configured to reserve a particular bandwidth for the digital content in the subscriber lines in response to a request by a particular consumer; and

downward bandwidth managing means, arranged in the optical line terminator, for controlling downloading of the digital content from the digital content retailer to the optical network unit of the particular consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth reserved by the resource reservation server.

2. (Rejected) A digital content downloading system using a network according to claim 1, wherein the particular bandwidth for the digital content reserved in response to the request by the particular consumer by the resource reservation server is guaranteed in a shared bandwidth of the subscriber lines.

3. (Rejected) A digital content downloading system using a network according to claim 1, wherein the particular bandwidth for the digital content reserved by the resource reservation server in response to the request by the particular consumer is guaranteed in a first signal having a wavelength differing from that of a second signal corresponding to a shared bandwidth of the subscriber lines.

4. (Rejected) A digital content downloading system using a network according to claim 1, wherein the optical network unit arranged on the side of the particular consumer comprises:

an optical wavelength demultiplexing unit configured to demultiplex a multiplexed optical signal of a first wavelength transmitting through the subscriber lines;

a first optical receiving unit configured to receive a plurality of optical signals of the first wavelength demultiplexed by the optical wavelength demultiplexing unit and to convert the optical signals into a plurality of digital signals;

a passive optical network processing unit configured to extract data of the digital content from the digital signals obtained by the first optical receiving unit;

a plurality of interfaces, connected to a plurality of terminals in one-to-one correspondence, configured to respectively transmit data matching the corresponding terminal to the corresponding terminal; and

a destination judging and header processing unit configured to judge the destination of the data of the digital content extracted by the passive optical network processing unit to determine a particular terminal to which the data of the digital content is downloaded, to perform header processing for the data of the digital content to identify the content retailer, and to transmit the data of the digital content to the particular terminal through one interface corresponding to the particular terminal.

5. (Rejected) A digital content downloading system using a network according to claim 1, wherein the optical network unit arranged on the side of the particular consumer comprises:

an optical wavelength demultiplexing unit configured to demultiplex a first multiplexed optical signal of a first wavelength transmitting through the subscriber line to a plurality of first optical signals of the first wavelength and to demultiplex a second multiplexed optical signal of a second wavelength transmitting through the subscriber line to a plurality of second optical signals of the second wavelength, the second multiplexed optical signal including data of the digital content of which the particular bandwidth is reserved by the resource reservation server;

a first optical receiving unit configured to receive the first optical signals of the first wavelength from the optical wavelength demultiplexing unit and to convert the first optical signals into a plurality of first digital signals;

a second optical receiving unit configured to receive the second optical signals of the second wavelength from the optical wavelength demultiplexing unit and to convert the second optical signals into a plurality of second digital signals;

a passive optical network processing unit configured to extract the data of the digital content from the second digital signals obtained by the second optical receiving unit;

a plurality of interfaces, connected to a plurality of terminals in one-to-one correspondence, configured to respectively transmit data matching the corresponding terminal to the corresponding terminal; and

a destination judging and header processing unit configured to judge the destination of the data of the digital content extracted by the passive optical network processing unit to determine a particular terminal to which the data of the digital content is downloaded, to

perform a header processing for the data of the digital content to identify the content retailer, and to transmit the data of the digital content to the particular terminal through one interface corresponding to the particular terminal.

6. (Rejected) A digital content downloading system using a network according to claim 1, wherein the content retailer is configured to charge the particular consumer for the downloading of the digital content according to the particular bandwidth reserved by the resource reservation server, a time period used for the downloading, or a time zone used for the downloading.

7. (Rejected) A digital content downloading system using a network according to claim 6, wherein information of charges corresponding to a bandwidth used for the downloading of data including the digital content, a time period used for the downloading of data including the digital content, or a time zone used for the downloading of data including the digital content is transmitted from the network operator to the consumers.

8. (Rejected) A digital content downloading system using a network according to claim 1, wherein the digital content is a music file, a video file, or a game software title.

9. (Rejected) A digital content downloading system using a network in which digital content, possessed by one of a plurality of content retailers communicatively coupled to the network, is downloaded to a consumer through the network, comprising:

a plurality of subscriber lines each formed of an optical fiber and arranged between the content retailers and the network, the network being managed by a network operator;

an optical line terminator, arranged on a side of the network, for terminating a subscriber line on the network side;

an optical network unit, arranged on a side of each content retailer, for terminating a subscriber line on the content retailer side;

a star coupler configured to connect the subscriber lines terminated by the optical network units to the subscriber line terminated by the optical line terminator;

a resource reservation server configured to reserve a particular bandwidth for the digital content in the subscriber lines for the downloading of the digital content to the consumer as a bandwidth reservation in response to a request by a particular content retailer;

upward bandwidth managing means, arranged in the optical line terminator, for receiving the bandwidth reservation from the resource reservation server; and

upward transmission control means, arranged in the optical network unit of a particular content retailer, for controlling downloading of the digital content from the optical network unit of the particular content retailer to the consumer so that the digital content is transmitted through the subscriber lines and the star coupler at the particular bandwidth according to the bandwidth reservation received from the upward bandwidth managing means.

10. (Rejected) A digital content downloading system using a network according to claim 9, wherein the particular bandwidth for the digital content reserved in response to the request by the particular content retailer by the resource reservation server is guaranteed in a shared bandwidth of the subscriber lines.

11. (Rejected) A digital content downloading system using a network according to claim 9, wherein the particular bandwidth for the digital content reserved by the resource

reservation server in response to the request by the particular content retailer is guaranteed in a first signal having a wavelength differing from that of a second signal corresponding to a shared bandwidth of the subscriber lines.

12. (Rejected) A digital content downloading system using a network according to claim 9, wherein the optical network unit arranged on the side of the particular content retailer, comprises:

- an interface configured to receive data of the digital content from an external terminal;

- a quality-of-service control unit configured to control the transmission of the data of the digital content received in the interface according to the bandwidth reservation received by the upward transmission control means;

- a passive optical network processing unit configured to control a transmission timing of the data of the digital content, of which the transmission is controlled in the quality-of-service control unit, to prevent the interference of the data of the digital content with data transmitted from the other optical network units;

- a first optical transmitting unit configured to convert the data of the digital content, of which the transmission timing is controlled in the passive optical network processing unit, into a plurality of optical signals having a first wavelength and transmitting the optical signals; and

- an optical wavelength multiplexing unit configured to multiplex the optical signals transmitted from the first optical transmitting unit to a multiplexed optical signal and to output the multiplexed optical signal to the corresponding subscriber line.

13. (Rejected) A digital content downloading system using a network according to claim 9, wherein the optical network unit arranged on the side of the particular content retailer, comprises:

an interface configured to receive first data and second data of the digital content from an external terminal;

a quality-of-service control unit configured to control the transmission of the first data and controlling the transmission of the second data of the digital content received in the interface according to the bandwidth reservation received by the upward transmission control means;

a passive optical network processing unit configured to control transmission timings of the first data and the second data of the digital content, of which the transmission is controlled in the quality-of-service control unit, to prevent the interference of the first data and the second data of the digital content with data transmitted from the other optical network units;

a first optical transmitting unit configured to convert the first data, of which the transmission timing is controlled in the passive optical network processing unit, into a plurality of first optical signals having a first wavelength and transmitting the first optical signals;

a second optical transmitting unit configured to convert the data of the digital content, of which the transmission timing is controlled in the passive optical network processing unit, into a plurality of second optical signals having a second wavelength, differing from the first wavelength and to transmit the second optical signals; and

an optical wavelength multiplexing unit configured to multiplex the first optical signals transmitted from the first optical transmitting unit to a first multiplexed optical signal, to multiplex the second optical signals transmitted from the second optical transmitting unit

to a second multiplexed optical signal, and to output the first multiplexed optical signal and the second multiplexed optical signal to the corresponding subscriber line.

14. (Rejected) A digital content downloading system using a network according to claim 9, wherein the network operator charges the particular content retailer for the downloading of the digital content according to the particular bandwidth reserved by the resource reservation server, a time period used for the downloading, or a time zone used for the downloading.

15. (Rejected) A digital content downloading system using a network according to claim 14, wherein information of charges corresponding to a bandwidth used for the downloading of data including the digital content, a time period used for the downloading of data including the digital content, or a time zone used for the downloading of data including the digital content is transmitted from the network operator to the content retailers.

16. (Rejected) A digital content downloading system using a network according to claim 9, wherein the digital content is a music file, a video file, or a game software title.

17. (Rejected) The digital downloading system of claim 1, wherein the resource reservation server is arranged in the network separate from the optical line terminator and the optical network units.

18. (Rejected) The digital downloading system of claim 1, wherein the resource reservation server is configured to reserve the particular bandwidth so that the particular bandwidth is reserved from a particular start time to a particular end time.

EVIDENCE APPENDIX

None

RELATED PROCEEDING APPENDIX

None